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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/164,517 | 09/30/1998 | JIE LIANG | TI-26414AA | 6766 |

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TEXAS INSTRUMENTS INCORPORATED
P O BOX 655474, M/S 3999
DALLAS, TX 75265

EXAMINER

WU, JINGGE

| ART UNIT | PAPER NUMBER |
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2623

DATE MAILED: 02/12/2002

14

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.
09/164,517

Applicant(s)
Liang et al.

Examiner
Jingge Wu

Art Unit
2623



-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE three MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on Dec 26, 2001
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7 is/are pending in the application.
- 4a) Of the above, claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

- 13) ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).
- a) ☐ All b) ☐ Some* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- *See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

- 15) ☐ Notice of References Cited (PTO-892) 18) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 16) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 19) ☐ Notice of Informal Patent Application (PTO-152)
- 17) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s). _____ 20) ☐ Other: _____

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Response to Amendment

1. Applicants' response to the last Office Action, filed Dec 26, 2001 has been entered and made of record.

Remarks

2. Applicant's arguments with respect to claims 1-7 regarding the filing date of US 6141446 have been fully considered, but they are not persuasive. The reference is a CIP of US 5966465 filed on May 3, 1996. The parent reference, US 5966465, has all the limitations the examiner used to reject claims 1-7, e.g. bitplanes and context model (col. 23) and arithmetic coding (col. 24 lines 57-67) etc. Therefore, the effective filing date of US 6141446 to Bolick can be viewed as at least as early as May 3, 1996, which properly renders Bolick as prior art.

3. In view of the Applicant's arguments, the objection of specification for failing to provide proper antecedent basis for claimed object matter is expressly withdrawn.

Claim Rejections - 35 U.S.C. § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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5. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. patent 6141446 to Bolick et al. ("Bolick") in view of U.S. patent 5442458 to Rabbani et al. ("Rabbani" a reference of record).

As to claim 1, Bolick discloses a method of encoding an image, comprising:

a) decomposing an image into bit plane(col. 20 lines 51-57); and

6. b) arithmetic encoding the bitplanes with a context model from the neighboring bits in a bitplane (Fig. 3 and 4, col. 10 line 57-col. 11 lines 39, col. 30 lines 7-17, and Fig. 7 col. 27 lines 41-65).

Bolick does not explicitly mention using the previous bit at the location in previous bit plane for the context model which is well known.

Rabbani, in an analogous environment, discloses the step of arithmetic encoding the bitplanes with a context model from the neighboring bits in a bitplane and previous bits at location in previous bitplanes (Fig. 3 col. 4 lines 49-67 and col. 5 lines 40-68).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to include the previous bit plane in the context model of Rabbani in the method of Bolick because it is desirable to obtain the optimal probability model based on the context and the efficiency for real time application (Rabbani, col. 1 lines 25-35). By using the scheme of Rabbani, the context for a coefficient contains more information about probability models of the coefficient so as to obtain efficient entropy compression of the coefficient so that the compression ration of the method is improved.

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7. Claims 2-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Bolick and Rabbani, further in view of U.S. patent 5357250 to Healey et al. ("Healey").

As to claim 2, Bolick further discloses the decomposition includes:

a) wavelet transform the image into a hierarchy of coefficients and bitplanes are of transform coefficients (col. 20 lines 46-67, col. 30 lines 7-17, and col. 27 lines 41-65) but does not mention the forgetting factor for adaptive context statistic determination which is well known in the art.

Healey, in an analogous environment, discloses that the arithmetic coding includes a forgetting factor for adaptive context statistic determination (col. 6 lines 13-54 and col. 9 lines 49-55).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to include the forgetting factor of the arithmetic coding in the method of Bolick because it is desirable to efficiently encode the data stream (Healey, col. 7, lines 36-47 and col. 9 lines 55-59). By using the scheme of Healey, the context model based on probabilities sets as a function of the past bits occurrences so as to obtain efficient entropy compression of the coefficient so that the compression ratio of the method is improved.

As to claim 3, the combination of Bolick, Rabbani, and Healey does not mention choosing forgetting factor is 127.

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However, choosing the length of the forgetting factor is a designing choice based on the computing power and practical requirement of projects.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to include the forgetting factor 127 in the method of the combination of Bolick, Rabbani, and Healey because it is desirable to obtain the optimal probability model based on the context for fast encoding (Healey, col. 7, lines 36-47 and col. 9, lines 55-59). By using the forgetting factor, the context for a coefficient would contain a class of distributions integrated with regard to a prior distribution so as to obtain efficient entropy compression of the coefficient so that the compression ration of the method is improved.

8. Claims 4-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Bolick and Rabbani, further in view of U.S. patent 5703646 to Oda.

As to claims 4 and 5, the combination of Bolick and Rabbani dos not mention I, P, B frames and bi-directional motion compensation which is well known in the art.

Oda, in an analogous environment, discloses I, P, B frames and bi-directional motion compensation (Fig. 5, col. 20 lines 25-55) as well as wavelet transforming the I frame (col. 22 lines 15-16).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use the wavelet compression for the I, P, B frames of Oda in the method of Bolick and Rabbani in the series video because it is desirable to obtain high quality image with

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complicated patterns in high speed encoding (Oda, col. 6 lines 31-43). By using the scheme of Oda, the quality of pictures as well as transmission speed of the method is improved.

9. Claims 6-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Bolick and Rabbani, further in view of U.S. patent 5901251 to Rust.

As to claim 6, the combination of Bolick and Rabbani does not explicitly mention simple and natural images and choosing the context model accordingly.

Rust, in an analogous environment, discloses the steps of :

a) the decomposition of the image into bitplanes includes a partition of the image into simple (text/line art) and natural (pattern) portions (col. 11 lines 7-24); and

b) the arithmetic coding uses different context modes for the simple and natural image portions (col. 5 line 52-col. 6 line 4 and col. 9 line 43-col. 10 line 2).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to include the adaptive arithmetic coding based on different context model of Rust in the method of Bolick because it is desirable to use arithmetic coding adaptive to the context for better compression (Rust, col. 3 line 33-col. 4 line 4). By using the scheme of Rust, the arithmetic coder adaptively uses context models for obtaining efficient entropy compression of the coefficient so that the compression ration of the method is improved.

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Conclusion

10. *THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).*

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Contact Information

11. Any inquiry concerning this communication or earlier communications should be directed to Jingge Wu whose telephone number is (703) 308-9588. He can normally be reached Monday through Thursday from 8:00 am to 5:30 pm. The examiner can be also reached on second alternate Fridays.

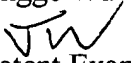
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Any inquiry of a general nature or relating to the status of this application should be directed to TC customer service whose telephone number is (703) 306-0377.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Amelia Au, can be reached at (703) 308-6604.

The Working Group Fax number is (703) 872-9314.

Jingge Wu


Patent Examiner

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February 5, 2002